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ABSTRACT

Materials contained in this guide present competencies describing carpentry skills necessary for success in initial employment or applicable to advanced educational placement, and may be used by administrators, students, and secondary and postsecondary vocational teachers. The student outcomes section provides guidelines for planning of and preparation for job opportunities and placement, for advanced placement in postsecondary education, and for allowing high school credit for previous experience. Section 2 lists eighteen carpentry competencies needed for initial employment (e.g., to lay out a floor system, to install building insulation). Under each competency is a description of circumstances under which the student will demonstrate the skill, and criteria of acceptable performance. A third section lists enabling tasks for each competency, describing activities necessary for developing a particular job skill. A glossary, a form for recording student achievement, and a class progress chart are also included. (TA)

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competencies for articulation

CARPENTRY

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CE 015 160

A Project of the
Lincoln Public Schools
Educational Service Unit No. 6
Southeast Community College

COMPETENCIES FOR ARTICULATION

CARPENTRY

An Exemplary Project in Vocational Education
Performed Pursuant to a Grant From The
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PREFACE

More emphasis than ever is being given to educational competencies. The public is questioning the basic abilities of graduates and is demanding that schools be more accountable for student performance. Educators are determined to give a clear definition of what students are expected to learn.

Although many people are interested in competencies, few seem able to explain what they mean or give specific examples. Staff members of this project can. They have addressed an important problem—articulation between schools—in terms of the competencies the students should have.

Defining competencies will not necessarily improve articulation. That improvement demands understanding, trust and cooperation among all concerned. Neither does the definition assume full-fledged, competency-based education – for that requires a complex system for instruction, assessment and certification that takes time to develop.

While these competency statements are not the whole picture, they are a significant achievement. If used properly, they will contribute to both better articulation and improved learning.

Ron Brandt,
Associate Superintendent for Instruction
Lincoln Public Schools

ACKNOWLEDGEMENTS

The significant contributions of committee members in the development of these materials are greatly appreciated. Members representing three educational agencies, the Lincoln Public Schools, Educational Service Unit No. 6 and Southeast Community College, combined skills to provide helpful materials for articulation purposes to teachers and administrators.

Persons representing business and industry in Lincoln, Milford and other cities in the Education Service Unit and Southeast Community College district also contributed expertise through a series of meetings. Vocational teachers from Lincoln and other communities, although not directly involved in the project, made similar contributions as materials developed.

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INTRODUCTION

Professional staff members of the Lincoln Public Schools, Educational Service Unit No. 6, and the Southeast Community College have joined with representatives of business and industry in developing these instructional materials.

The educational materials in this guide may be used by administrators, students, and secondary and post-secondary vocational teachers. They are designed to help students move from class to class, grade to grade, secondary studies to post-secondary school or employment. The materials consist of:

1. Student Outcomes
2. Competencies for Job or Advanced Placement
3. Enabling Tasks
4. Glossary of Terms
5. Record of Individual Student Skill Achievement and
6. Class Progress Chart

This information is not limited to a particular vocational course but to a set of competencies. These competencies describe skills necessary for success in initial employment or applicable to advanced placement for educational purposes.

Some schools may be able to provide more opportunities for students to complete competencies and tasks than others. Whatever the case, teachers and administrators will find the materials helpful when planning programs for students and for determining what educational experiences may be made available to them. Students may use the materials to understand and plan the skill developments necessary for employment and additional education.

Teachers and students should keep records of competencies as they develop. Two record forms, one for charting competencies of all students in a class, the other an individual student record, are included in the materials. These records may be used by students and teachers to chart progress toward specific job skills, and as achievement records for presentation with job or post-secondary school applications.

Student Outcomes

Information that will help administrators, teachers and students plan programs at both secondary and post-secondary levels is provided. It applies to:

1. Planning of and preparing for job opportunities and placement;

2. Planning of and preparing for advanced placement in post-secondary education;

3. Allowing high school credit for previous experience.

"Student outcomes" describe what a particular instruction has prepared a student to do.

JOB OPPORTUNITIES

Many carpentry positions available in the Lincoln community and in surrounding areas are listed along with the Dictionary of Occupational Titles and the Office of Education codes.

Recommended competencies to be developed by students for initial employment are given. Students may use this information to plan and prepare school experiences properly.

Dictionary of Occupational Titles Code Number	Office of Education Code Classification	Occupational Title	Competencies Necessary for Initial Employment	Recommended Additional Training
860.381	17.1001	Carpenter	1 through 18	Welding, concrete forming and pouring, sheet metal, electrical, plumbing and heating
860.281	17.1001	Carpenter, Maintenance	2 through 18	Plastic laminates, glass & tile installation, cabinet making. Window shades, venetian blind, and curtain rod installation
860.381	17.1001	Carpenter, Finish	9 through 18	Suspended ceiling installation, laying hardwood floors
860.381	17.1001	Carpenter, Framing	2 through 9,12	Basic electricity, scaffolding assembly
860.381	17.1001	Carpenter Apprentice	1 through 18	
860.131	17.1001	Carpenter Supervisor	1 through 18	Form building, laying hardwood floors, additional experience
860.381	17.1001	Building-Insulating Carpenter	2,3,5,6,7,8,10 11,15,17	Blowing insulation, repair of woodwork, stone, brick, and stucco after insulating, finish carpentry work
860.137	17.1001	Carpenter-Labor Supervisor	1 through 18	Concrete pouring experience, basic electricity, scaffolding construction and assembly
863.884	17.1009	Insulation Installer	11	Furring strip installation
866.381	17.1010	Roofer (Composition, wood shingle or shake roofer)	8	Wood shingle and shake application
860.281	17.1001	Carpenter-Inspector	2 through 18	Keeping of appropriate records plus additional experience

ADVANCED PLACEMENT POLICY STATEMENT

Southeast Community College
Lincoln and Milford Campuses

The College believes that students should be recognized and rewarded for previous educational and occupational experience when that experience results in competence in areas normally addressed by the courses and programs of the College. Advanced standing may be awarded with full credit, up to limits established by each department of the College but not exceeding 30 credit hours. Credits earned in other accredited educational institutions in excess of 30 hours may be accepted by the department.

The College has established the following methods to enable students to gain advanced standing:

CREDIT BY EXAMINATION

Some courses have been identified which may be completed by examination. Testing devices and evaluation procedures will vary according to the course, departmental requirements and the amount of credit being advanced.

To apply for credit by examination, the applicant must have been accepted for admission to the College and have established a transcript. Applications for Credit by Waiver or Examination must be submitted to the department from which credit would be granted.

Applicants for credit by examination must pay the following: 50% of the current per credit hour fee for each credit hour attempted by examination. This fee must be paid prior to the examination.

A "Credit by Examination Notice" will be forwarded to the Campus Registrar for all credit granted by examination. The Registrar will record all credit granted as "Px" (Passed by Examination) on the transcript. No honor points will be awarded and the credit by examination will not be included in the cumulative grade point average (CGPA).

CREDIT BY WAIVER

Some courses and series of courses have been identified which may be waived in meeting program graduation requirements.

Students requesting advanced standing Credit by Waiver must: Complete an Application for Credit by Waiver or Examination and submit the application for evaluation to the department granting the waiver.

Upon completion of the evaluation, submit the application and evaluation to the Campus Registrar for recording on their transcript.

The following entry will be made on the student's transcript for all course credit granted by waiver: "The following program requirements were waived by substituting previous education and/or occupational experience. (list courses waived.) This waiver of program requirements was granted this date _____ by _____ (evaluator) and is in accordance with Department, Campus and Area policies, rules and regulations."

No fee will be charged for advanced credit by waiver.

Credit by Waiver will not be included in calculating student's grade point average (CGPA).

Credit granted by waiver is subject to evaluation by other departments, programs and other institutions and probably would not be accepted as transfer credit by them.

Credit granted by waiver will be contingent upon satisfactory completion of advanced courses.

ADVANCED PLACEMENT CREDIT

Advanced placement in the Building Construction Program of the Milford Campus of Southeast Community College will be determined on the basis of competencies which the prospective student demonstrates according to the following:

Students Demonstrating Competency No.	Will Receive SCC Credit In the Amount of	For SCC Course No.	Course Title
1	½	4700122	Reinforced Concrete, Steel & Masonry Structures
2	1	4700532	Building Construction I
3	1	4700532	Building Construction I
4	1	4700532	Building Construction I
5	1	4700224	Woodworking Processes and Practices
6	½	4700532	Building Construction I
7	½	4700532	Building Construction I
8	½	4700532	Building Construction I
9	1	4700532	Building Construction I
10	½	4700532	Building Construction I
11	½	4700532	Building Construction I
12	½	4700532	Building Construction I
13	½	4700532	Building Construction I
14	1½	4700224	Woodworking Processes and Practices
15	¼	4700224	Woodworking Processes and Practices
16	½	4700224	Woodworking Processes and Practices
17	¼	4700224	Woodworking Processes and Practices
18	1	4700532	Building Construction I

The program supervisor of the Building Construction Program has the responsibility for conducting and evaluating examinations to determine the competency level of students requesting consideration under this agreement.

Examinations used for evaluation purposes will be updated from time to time although every effort will be made to maintain their consistency with the competencies identified in this agreement.

This agreement cannot, however, be considered a contract between Southeast Community College-Milford Campus and any prospective student. The Board of Governors of the College reserves the right to make changes in courses required, courses offered, credits waived, credits granted, and in any other matter it deems necessary without revision of this agreement and without notice. Prospective students wishing consideration under this agreement should contact the program supervisor in order to establish and maintain a close working relationship between the College, its program, and the student.

HIGH SCHOOL CREDIT

High school credits are suggested for each competency. It is the responsibility of each educational agency to determine the level of competency and the amount of credit to be awarded.

Competency	Semester Credit Hours	Competency	Semester Credit Hours
1	2½	8	1
2A	½	9	3
2B	2	10	1
2C	½	11	½
2D	½	12	1
3A	2	13	1
3B	2	14A	1½
4	2	14B	2
5A	1	14C	1
5B	2½	15	1
6A	1½	16	3
6B	2	17	2
7A	1	18	1
7B	1		

Competencies

A competency consists of three sections or parts that combine to provide a detailed outline of a major task that a student must accomplish to reach one or more previously stated student outcomes. Competencies are described as follows:

a. Task – What the student must do to demonstrate an ability to do the job.

b. Conditions or Limitations – A description of the circumstances under which the student will demonstrate the skill. Usually included are:

   1. time allowance;
   2. tolerances allowed;
   3. references which may be used;
   4. specific tools and materials to be used (common tool lists are generally omitted unless a required usage is to be demonstrated);
   5. work location (if other than school site);
   6. and, other limitations unique to the task.

c. Criteria of Acceptable Performance – Standards described that constitute acceptable performance. These standards must:

   1. be compatible with the task and the condition;
   2. evaluate all components of the conditions;
   3. include the percentage of responses that must be correct if the competency is primarily cognitive;
   4. and, specify the standard for the criteria. This may take the form of a list of criteria, an instructor's checklist, or references to an authoritative manual such as an automotive flat-rate manual.

Represented in the guide are those competencies needed for initial employment. They are not designated or described by grade level. A student may complete all the competencies available at a school if learning capabilities and time permit.

GENERAL CONDITIONS AND LIMITATIONS:

The following competencies are written for a full-size layout (example 28' x 52') but may be scaled down to a mock-up (8' x 12' min.) floor system. Platform framing will be used throughout. HUD minimum property standards and local building codes will be used. No time limits required. References may be used only when performing the skill required.

GENERAL CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Equipment properly used and maintained.
2. Safety practices adhered to according to HUD Minimum Property Standards, Sect. 600-3.
3. Functions of all tools and component construction parts identified and described.
4. Area left in working condition

TASK:

To lay out a building on site.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a 100' steel tape, builder's level, tripod, leveling rod, and plumb bob), the student will use a builder's level to lay out a building 28'-0" x 52'-0". Steel or wood batterboards are to be used.

CRITERION OF ACCEPTABLE PERFORMANCE:

1. Builder's level
   a. Bubbles level.
   b. Eyepiece, crosshairs, telescope focused.
   c. Vernier scale to read nearest 5' of 1°.
2. Use proper hand signals.
3. Layout
   a. Property lines established with 100 percent accuracy.
   b. Set back and baseline established – according to local building code.
   c. Diagonal measure checks within 1/8" max. tolerance.
   d. Building line dimensions must be 28'-0" x 52'-0".
   e. Squareness within 1° error using vernier scale.
4. Batterboards
   a. Minimum setback 8'-0".
   b. Same elevation (within 1/8").
   c. Batterboards will indicate exact location of building line, footing line, and excavation line.

TASK:

To lay out and construct a floor system.

GENERAL CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a portable electric saw and saw protractor, print of floor and foundation plan) and the foundation ready for framing, the student will lay out and construct a floor system made up of the following parts.

A. Built-up Girder

CONDITIONS AND LIMITATIONS:

Given sufficient 2 x ( ) material and plywood, 20d nails for minimum girder size of 6" x 8" (nominal) for full size layout, or 4" x 6" (nominal) for mock-up, with the bearing surface on the foundation according to the local building code, the student will lay out and build a built-up girder.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Space splices a minimum of 6'-0", and nail with 20d nails at maximum 32" o.c.
2. The girder top shall be at the elevation of the foundation top.
3. The girder must be level and free from any twisting.
4. The work will comply with the HUD Minimum Property Standards for one- and two-family dwellings Sect. 606-4.4a & d, and the local building code.

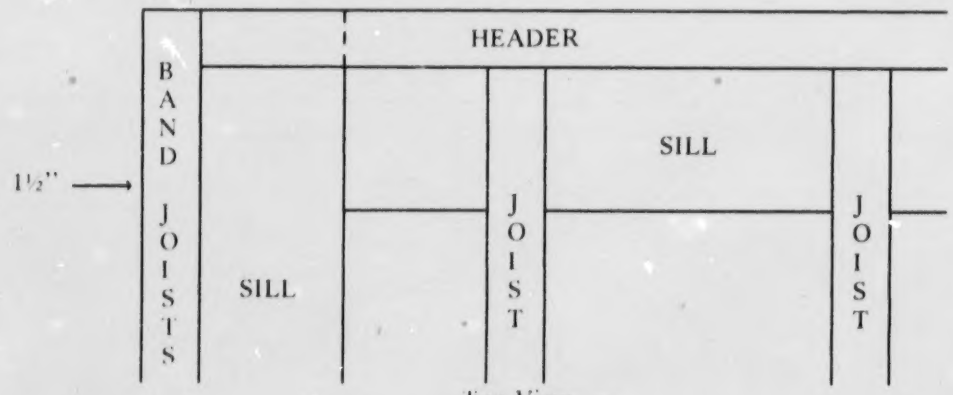
B. Mud Sill, Box Header, and Floor Joist

CONDITIONS AND LIMITATIONS:

Given sufficient 2 x ( ) material, 16d nails, 26 ga. galvanized termite shield, sill sealer, and built-up girder properly framed, the student will lay out and assemble the mud sill, box header, and floor joists.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. The sill will cover the width of the foundation and provide a maximum bearing surface for the joist.
2. The corner assembly for the sill and box header will be assembled as shown below.



Top View

3. The sill will be anchored properly according to HUD Minimum Property Standards, Sect. 606-4.3d.

4. Termite protection will be installed according to HUD Minimum Property Standards, Sect. 606-2.1.

5. Sill sealer will be applied between the foundation and the sill.

6. Floor joist locations will be laid out on the box header at 16" o.c., including all double joists, trimmers and openings needed.

7. Girder tops will be laid out to receive the floor joists (either lapped or butted and spliced) on top of girder.

8. Floor joists will be nailed in place complete with trimmers, openings, headers and doubles for parallel walls. All joists will be placed according to HUD Minimum Property Standards, Sect. 606-4.4. A 1/16" tolerance will be allowed at any one joist.

C. Crossbridging and Solid Blocking

CONDITIONS AND LIMITATIONS:

Given sufficient 1 x ( ), 2 x ( ) material, 6d ring shank and 16d nails, floor joists and box header in place, the student will cut and install all crossbridging and solid blocking.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Lay out the crossbridging for the floor system using 1 x 3 or 1 x 4 and install the bridging where joist span exceeds 10'. Two 6d (minimum) nails are to be used at each end of the bridging.

2. Cut and install all solid blocking shown on the plan using the staggered system for nailing.

D. Subfloor

CONDITIONS AND LIMITATIONS:

Given ½" CDX plywood, 6d (minimum) nails, mastic and the floor framing completed, the student will apply the sub-floor.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Line up all joists for nailing the sub-floor at 16" o.c.

2. Run the sub-floor top veneer grain at right angles to joist span with minimal waste.

3. Use mastic on joist tops.

4. Sub-floor ends to be spliced on a joist. Splice must occur at the center of the joist. Adacent splices to be staggered a minimum of one joist spacing. Use 6d nails (minimum).

5. The sub-floor application will comply with HUD Tables 6-6.3 and 6-6.4 and American Plywood Association standards pamphlet: "Glued Floor System."

TASK:

To lay out, cut, and assemble exterior and interior frame walls and exterior sheathing.

GENERAL CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a portable circular saw, the first floor plan, and door and window schedule), the student will build the interior and exterior walls including framing for at least one interior and one exterior door and one exterior window. Modular layout is to be used.

A. Exterior Frame Walls

CONDITIONS AND LIMITATIONS:

Given sufficient 2 x 4's and 2 x 12's, 1 x 4 bracing material, 16d and 8d nails for framing, ½" CDX plywood and blackjack for sheathing, 1½" galvanized roofing nails, 7d galvanized nails and the floor system properly framed, the student will build and erect the exterior frame walls.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Studs 16" o.c.
2. All plates and headers level and walls plumb (1/8" tolerance).
3. Framing must correspond to floor plan and door and window schedule (1/8" tolerance).
4. Sheathing applied according to manufacturer's specifications.
5. All work must meet HUD Minimum Property Standards, Sect. 606-4.7 A-I (Walls and Partition Framing), Sect. 606-5.4, Table 6-6.5 (Sheathing) and local building code.

B. Interior Frame Walls

CONDITIONS AND LIMITATIONS:

Given sufficient 2 x 4 and 2 x 12 material, ½"CDX plywood, header spacers, and 16d box nails, with floor system and exterior walls properly framed to receive interior frame walls, the student will build and erect the interior frame walls.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. All bearing partition studs 16" o.c. and double 2 x 12 headers in door openings. Non-bearing partition studs 24" o.c. (maximum) with double 2 x 4 headers.
2. All plates and headers level and walls plumb, (1/8" tolerance).
3. Framing must correspond to first floor plan and door schedule, (1/8" tolerance).
4. All work must meet HUD Minimum Property Standards, Sect. 606-4.7 A-I (Walls and Partition Framing) and local building code.

COMPETENCY NO. 4

TASK:

To lay out, cut and install ceiling joists and bracing.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a portable circular saw, sufficient 2 x ( ) material to meet the span and spacing requirements of joists and bracing, 16d box nails, and 8d nails), and the exterior walls and bearing partition properly framed, the student will lay out, cut, and install ceiling joists and bracing.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Apply the ceiling joists parallel to the rafters (16" o.c.) and bracing as needed (1/16" maximum tolerance from the plate layout at any one joist).

2. All work must comply with HUD Minimum Property Standards, Sect. 606-4.5 (Ceiling Framing) and Sect. 606-4.6.b., (Roof Framing) and local building code.

TASK:

To lay out, cut, and install ridge board, common rafters, and roof bracing.

GENERAL CONDITION AND LIMITATIONS:

Given the necessary tools and materials (including a portable circular saw and framing square with rafter table), and the walls properly framed, the student will lay out, cut, and install the ridge board, common rafters, and roof bracing.

A. Ridge Board

CONDITIONS AND LIMITATIONS:

Given sufficient 1 x ( ) or 2 x ( ) material and 16d box nails, the student will lay out, cut, and install the ridge board.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. The ridge board is to be layed out 16" o.c. to match the corresponding exterior walls, (1/16" maximum tolerance allowed at ridge at any one rafter location).

2. The ridge board must meet HUD Minimum Property Standards, Sect. 606-4.6c (Roof Framing) and local building code.

B. Common Rafters and Roof Bracing

CONDITIONS AND LIMITATIONS:

Given sufficient 2 x ( ) material for slope, span, and spacing, 16d nails, and the elevation plan, the student will lay out, cut and install the rafter and roof bracing.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Common rafters should be placed according to specifications (1/16" maximum tolerance allowed at plate and ridge at any one rafter).

2. All plumb and level cuts on rafters and bracing shall fit tightly to adjoining members.

3. Ridge board must be level and straight, (1/8" tolerance).

4. All work must comply with HUD Minimum Property Standards, Sect. 606-4.6 A-F (Roof Framing) and local building code.

TASK:

To lay out, cut, and install gable end studs, subfascia, ribbon, lookouts, and fascia.

GENERAL CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a portable circular saw and elevation plans), and the walls and roof framing complete, the student will lay out, cut, and install the gable end studs, subfascia, ribbon, lookouts, and fascia.

A. Gable End Studs

CONDITIONS AND REQUIREMENTS:

Given sufficient 2 x 4 material, 8d nails, and 16 d nails, the student will lay out, cut and install the gable end studs.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Layout 16" o.c. corresponding with studs below.
2. Secure common difference of stud lengths using framing square (1/16" tolerance allowed).
3. Toenail into plate using 8d nails.
4. Spike top into rafter using 16d nails.
5. Work must comply with local building code.

B. Exterior Eave and Rake Trim Including Subfascia, Ribbon, Lookouts and Fascia

CONDITIONS AND LIMITATIONS:

Given sufficient material of 2 x 4 for lookouts, 1 x 4 for ribbon, 2 x 6 for subfascia, 1 x 8 for fascia, 7d galvanized box nails, 8d nails, and 16d nails, the student will cut and install subfascia, ribbons, lookouts, and fascia.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Subfascia
   a. Outside top edge flush with top of rafter (1/16" tolerance).
   b. Length from outside of barge rafter to outside of barge rafter (1/16" tolerance).
   c. Nailed to rafters using 16d nails.
2. Ribbon
   a. Locate and nail ribbon level with bottom of subfascia using 8d box or common nails.
   b. Length is to be determined from outside of barge rafter to outside of opposite barge rafter.

3. Lookouts

   a. Layout for lookouts 24" o.c. to come out same side of each rafter.
   b. Cut lookout to length (1/16" tolerance).
   c. Nail to ribbon using 8d box nails and to subfascia using 16d nails.

4. Fascia

   a. All corners and splices 45°miter (no tolerance).
   b. Top of outside flush with bottom of sheathing cut to angle of rafter.
   c. Width of fascia equal to width of subfascia and soffit plus 1 inch.
   d. Nailed in place using three 8d galvanized box nails at approximately every 16 inches.

TASK:

To apply roof sheathing, roofing felt, and soffit.

GENERAL CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a portable circular saw) and the roof framing complete, the student will apply roof sheathing and felt, and cut and install soffit at eaves and rake.

A. Roof Sheathing and Felt

CONDITIONS AND LIMITATIONS:

Given CDX plywood sheathing (thickness determined by roof load), 15 lb. felt, discs, and nails as required, the student will apply the roof sheathing and felt.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Plywood sheathing applied with face grain perpendicular to rafters, C side up and D side down.
2. Plywood pieces covering at least two rafter spaces and nailed according to American Plywood Association standards pamphlet 6.3d (Plywood Sheathing for Walls and Roofs).
3. 36" felt applied horizontally (2" top lap and 4" end lap starting at eave).
4. All rows of felt applied straight with eave and free of wrinkles.
5. Discs applied every 16"-18" vertically and horizontally.
6. Work must comply with the local building code.

B. Soffit at Eaves and Rake

CONDITIONS AND LIMITATIONS:

Given 3/8" plywood soffit, 5d galvanized nails, 1 x 4 nailer for rake, and 2 x 4 nailer for return, the student will cut and install the soffit at eaves and rake.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Length of 1 x 4 nailer for rake soffit to be from center of ridge to outside of wall sheathing parallel to pitch. Nail in place using 8d box nails.
2. Length of return 2 x 4 nailer equal to distance from wall sheathing to outside of barge rafter. Nail in place using 16d box nails.
3. Rip eave and rake soffit to correct width (1/8" tolerance).
4. Nail soffit in place at gable ends. Start at the peak of the rake. Lower ends need only to extend past the outside of wall sheathing (1/8" tolerance).
5. Nail soffit under eaves using 5d galvanized nails. Front of soffit flush with inside of finish fascia projecting to outside face of barge rafter. Back of soffit within 1/4" of back face of ribbon.
6. Work must comply with the local building code.

TASK:

To apply asphalt shingles and appropriate flashing.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including gutter flashing, rake drip edge, roofing nails, 3-tab self-stick 240# asphalt shingles) and the roof framing and sheathing complete, the student will apply the shingles, rake edge and ridge cap to the gable roof.

CRITERIA OF ACCEPTABLE PERFORMANCE:

Work must comply with the *ASPHALT ROOFING MFG. ASSOCIATION STANDARDS*, Twelfth edition, 1974, 757 Third Avenue, New York, N.Y. 10017.

TASK:

To set exterior door jambs, hang doors, and set windows.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a router and hinge butt template, jamb material, 16d casing nails, window schedule, manufactured windows and doors, and lock set and hinges) and properly framed and sheathed exterior walls, the student will set the jambs, hang the doors and set the windows.

CRITERIA OF ACCEPTABLE PERFORMANCE:

General:

1. Felt building paper applied over wall sheathing according to HUD Minimum Property Standards, Section 606-5.5a, b, c.
2. Nail brick mold with 16d casing nails at 16" intervals.
3. All work must comply with HUD Minimum Property Standards, Section 606-6 and local building code.

A. Jambs

1. Exterior door jambs to be assembled according to manufacturer's recommendations and set plumb and level.
2. Jambs will be primed before installation.
3. Adjustments in leveling to be made with wedges under side jamb while sill and jamb rest firmly on framing.
4. Door sill top must be at finish floor elevation.
5. Jambs must be shimmed tight at sides.

B. Doors

1. Lock set shall be installed according to manufacturer's specifications.
2. Exterior doors shall be hung with 3 hinges 4" x 4". One pre-hung door is allowed.
3. Exterior doors shall be hung in accordance with HUD Minimum Property Standards, Section 608-1 through 608-2.4, and 608-3.1.

C. Windows:

1. Windows shall be set plumb and level and in accordance with HUD Minimum Property Standards, Sections 606-6 and 608-4.1 through 608-4.4.

TASK:

To apply horizontal and vertical wood or wood derivative siding.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including horizontal and vertical siding, 8d galvanized nails, and elevation drawing), and properly framed exterior walls with windows, doors and exterior trim installed, the student will apply both horizontal and vertical siding.

CRITERIA OF ACCEPTABLE PERFORMANCE:

Siding shall be applied in accordance with HUD Minimum Property Standards, Section 609-2.1 and 609-2.2, and local building code.

A. Application of horizontal siding must meet the following additional criteria:

1. Felt paper shall be applied over board sheathing.
2. Water table shall be level and uniform.
3. Minimum amount of lap is 1" for lap siding
4. A story pole must be used to assure level courses and uniform exposure.
5. Joints shall be staggered in successive courses.
6. Corners shall be mitered, capped or include corner boards.
7. Appropriate drip cap will be applied over any openings below soffit line.
8. All flashing shall be included to assure a watertight wall covering.
9. Flashing shall be used when siding meets roof covering.
10. Nailing shall be in accordance with manufacturers recommendations.

B. Application of vertical siding must meet the following additional criteria:

1. Felt paper shall be applied to board sheathing.
2. Board and batten, batten and board, board and board, plywood sheet, and hardboard sheet siding arrangments may be used.
3. Flashing shall be installed to assure a weathertight seal.
4. A method of waterproofing the joints shall be used unless shiplapped or matched joints are used.

5. A 1/16" edge and end spacing shall be used when installing plywood in sheet form.
6. Bottom edge of all siding set a minimum of 8" above grade line.
7. Proper flashing shall be used where siding meets roof covering.
8. Nailing shall be in accordance with manufacturer's recommendations.

TASK:

To install building insulation.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials, the building properly framed and exterior wall covering applied, and all utilities including plumbing, heating, and electrical wiring properly installed, the student will install both batt and rigid type insulation as shown in the sectional view plan.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. The insulation must meet HUD Sect. 507-3 (Building Insulation).

2. The installation must be according to manufacturer's specifications.

TASK:

To construct and install soffit for cabinets.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including sufficient 2 x 4's, ½" CDX plywood, 6d and 16d nails, and floor plan and/or cabinet elevations), the student will construct and install soffit for cabinets according to the plan.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Lookouts 16" o.c.
2. Soffit to be plumb, level and square (1/16" tolerance allowed).
3. Size according to plan (minimum ½" larger than cabinets).

TASK:

To lay out, cut, and install underlayment on floors.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including sufficient particle board, 6d cement coat or ring shank nails), and floor and wall systems properly framed with interior wall covering applied, the student will lay out, cut and install the floor underlayment.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. 1/8" space shall be left along an edge next to any vertical surface.
2. Joints of the underlayment panels shall be staggered.
3. Direction of continuous (edge) joists shall be parallel to those in the sub-floor.
4. No joints in underlayment in line with those in subfloor.
5. Panels spaced 1/32" at each joint.
6. Nails spaced not more than 6" apart along and into floor joists (or 12" if mastic is used).

TASK:

To install interior doors and jambs with trim and hardware.

A. Interior Door Jambs

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including pre-cut jamb material, cedar shingle shims, 8d finish nails, interior door, and room finish and door schedule) and with interior walls framed and wall covering applied and rough opening 2¼" larger than door size, the student will set an interior door jamb.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Jamb set plumb and shimmed on hinge side, nailed minimum of 5 places with 2-8d finish nails in each place.
2. Side jamb cut to length at 81". Head jamb cut so door will have 3/32" clearance on hinged side when door is closed.
3. Latch side of jamb and head jamb shall not be fastened to rough opening, but shall be fit to door after door is hung.
4. Jamb set in center of rough opening and flush with both wall surfaces.
5. All jamb surfaces and edges to be plumb and level.
6. All nail heads shall be set 1/16" below the surface.
7. Hammer marks shall not be visible on the door jambs.

B. Interior Door

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including hinge butt template, router, door jack, portable power plane, interior door, and 3½" butt hinges) and the jamb properly set on hinge side, the student will hang the door and set the jamb.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Door to be uniform width for entire length with 3° bevel on latch side.
2. Hinge butt template setup according to manufacturer's specifications.
3. Door and jamb will have 2 or 3 hinges properly flush-gained.
4. Top clearance (door-jamb) will be 1/16" to 3/32", side clearance will be 3/32" to 1/8", uniform throughout. Bottom clearance to accommodate floor covering.
5. After door is hung, jamb setting will be completed in the same manner as hinge side.

C. Door Trim and Hardware

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including boring-jig kit and miter box, 4d and 6d finish nails, lock set and door trim) and a properly set door and jamb, the student will install the door trim and hardware.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. 3/16" jamb reveal.
2. Casing miters tight.
3. 4d nails used on jamb side of trim, 6d nails used on wall side of trim. Nailed minimum of 5 places on side casing and 3 places on head casing.
4. Stop set at door thickness and mitered or coped. Nailed in 5 places with 4d finish nails.
5. Lockset shall be set according to manufacturer's specifications. Face plate set flush with door edge.
6. Strike plate set flush with jamb, no play in door when closed.
7. All nail heads shall be set 1/16" below the surface.
8. Hammer marks shall not be visible on the door trim.

TASK:

To install trim on windows.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a miter box and casing material), the student will install the trim on windows using the picture frame method.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. Uniform 3/16" jamb reveal.
2. Casing cut with tight miters and nailed 16" o.c. with 4d finish nails at jamb, 6d finish nails at wall.
3. All nail heads shall be set 1/16" below the surface.
4. Hammer marks shall not be visible on the window trim.

TASK:

To lay out, cut, and install a stairway.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a portable circular saw, 2 x 12 stringers and treads, 1 x 8 risers, 8d and 16d nails, framing square with stair gauges, and stairway detail plan), the student will lay out, cut, and install a straight-run basement stairway.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. All treads and risers same width and height.
2. Total rise, run and width of stairs according to stair detail and local building code.
3. All stair treads to be level.
4. Treads nailed with 16d casing and risers nailed with 8d cement coat box nails from back side into tread.
5. Work to comply with HUD Section 606-4.8 and 402-6.

TASK:

To cut and install baseboard.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a miter box, baseboard, and 6d finish nails), with interior walls framed and covered, and all doors hung and trimmed, the student will cut and install the baseboard.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. All interior corners shall be a coped joint and all exterior corners a miter joint.
2. Baseboard shall be nailed with 2-6d finish nails spaced 16 inches o.c. The lower nail angled into the sole plate, and the top nail nailed into the stud.
3. All nail heads shall be set 1/16" below the surface.
4. Hammer marks shall not be visible on the baseboard.
5. Splices will be mitered, baseboard shall be butted to door casing, and all joints will be tight.
6. Elevation of baseboard shall coincide with room finish schedule.

TASK:

To install kitchen and bath cabinets.

CONDITIONS AND LIMITATIONS:

Given the necessary tools and materials (including a power screw driver, 2½" x #10 F.H. wood screws, and interior elevation), the student will hang the kitchen and bath cabinets according to the interior elevation plan.

CRITERIA OF ACCEPTABLE PERFORMANCE:

1. All cabinets installed plumb and level (1/16" tolerance).
2. If cabinets are in sections, they will be joined through the ends with 1¼" x #8 F.H. wood screws and with bottom edges and fronts flush. Cabinets fastened to each stud with 2½" x #10 F.H. wood screws.
3. Base cabinets shall be fastened to each stud using 2½" x #10 F.H. woodscrews.
4. Upper cabinets will be fastened to each soffit look-out (or ceiling joist if no soffit) using 2½" x #10 F.H. woodscrews.
5. All screws shall be countersunk.
6. Island or peninsula base units to be fastened to finish floor or underlayment using fastening blocks inside of base.

Enabling Tasks

The enabling tasks are the activities necessary for developing a job skill. The completion of all enabling tasks for a competency leads to achievement of that competency. They may become daily or weekly lesson plans if teachers develop conditions and criteria similar to those developed for the competencies. The enabling tasks have been suggested by people in business and industry.

ENABLING TASKS

GENERAL TASKS APPLICABLE TO ALL COMPETENCIES

Safely operate all designated tools and equipment
Use working drawings in actual construction
Store supplies as they arrive on the site to prevent damage
Read, interpret and use dimensions on blueprints or working drawings in actual construction
Utilize specific job-designated lumber and materials
Differentiate and select types and sizes of rough hardware (nails, bolts, screws, etc.)
Adhere to local building code
Plan use of lumber and materials in order to limit waste

COMPETENCY No. 1 – TO LAY OUT A BUILDING ON SITE

Determine location of building on site
Suspend and square foundation lines
Set up and use builder's level
Erect batter boards
Suspend building lines from batter boards
Square building lines at corners and check layout for squareness

COMPETENCY No. 2 – TO LAY OUT AND CONSTRUCT A FLOOR SYSTEM

GENERAL TASKS
Differentiate nominal and finished sizes of lumber and select lumber sizes
Detect warp and other defects in lumber
Level the floor system
Does framing, e.g., braced, balloon, plank and beam, etc.

A. BUILT-UP GIRDER
Construct and install built-up wood girders
Install girders in masonry walls
Install ledger boards on girder and sills to support floor joists

B. MUDSILL, BOX HEADER, AND FLOOR JOISTS
Check foundations for squareness
Cut and install wood sill
Install bridle irons or joist hangers to support floor joists
Frame floor opening for stairs, installing joist headers and trimmers and tail joists
Frame floor opening for chimney, installing joist headers and trimmers and tail joists
Check the top of the joists to see if they are in a straight line and remedy any misalignment
Make notches and holes in joists so as not to decrease strength

C. CROSS BRIDGING AND SOLID BLOCKING
Cut and install wood cross bridging or other types of bridging and blocking

D. SUB-FLOOR
Differentiate and select plywood, particle board, hardboard, etc.
Lay plank or plywood sub-flooring
Recognize direction of grain in wood

COMPETENCY No. 3 – TO LAY OUT, CUT, AND ASSEMBLE EXTERIOR AND INTERIOR FRAME WALLS, AND EXTERIOR SHEATHING

GENERAL TASKS
Differentiate nominal and finished sizes of lumber and select lumber sizes
Detect warp and other defects in lumber
Does framing, e.g., platform, braced, balloon, plank and beam, etc.
Lay out location of partitions and walls
Construct and install exterior and interior corner posts
Cut and install sole plates and top plates
Cut and install studs
Frame wall openings for door and windows
Plumb and level walls

A. EXTERIOR FRAME WALLS
Differentiate and select plywood, gypsum board, sheathing, hardboard, etc.
Cut and install wall bracing
Install wall and roof sheathing
Install plywood, fiberboard, or gypsum sheathing
Recognize direction of grain in wood

B. INTERIOR FRAME WALLS
Frame bearing and non-bearing partitions

COMPETENCY No. 4 – TO LAY OUT, CUT, AND INSTALL CEILING JOISTS AND BRACING
Differentiate nominal and finished sizes of lumber and select lumber sizes
Detect warp and other defects in lumber
Does framing, e.g., platform, braced, balloon, plank and beam, etc.
Cut and install ceiling or second floor joists

COMPETENCY No. 5 – TO LAY OUT, CUT, AND INSTALL RIDGE BOARD, COMMON RAFTERS, AND ROOF BRACING

GENERAL TASKS
Differentiate nominal and finished sizes of lumber and select lumber sizes
Detect warp and other defects in lumber
Does framing, e.g., platform, braced, balloon, plank and beam, etc.

A. RIDGE BOARD
Cut, place and level ridge board

B. COMMON RAFTERS AND ROOF BRACING
Lay out rafters by line-length method on the rafter scale of the framing square and make proper deductions or adjustments
Determine the run, rise, and pitch of common rafters
Make seat cut and ridge cut on common rafters
Lay out, cut, and install roof bracing

COMPETENCY No. 6 – TO LAY OUT, CUT, AND INSTALL GABLE END STUDS, SUBFASCIA, RIBBON, LOOK-OUTS, AND FASCIA

GENERAL TASKS
Differentiate nominal and finished sizes of lumber and select lumber sizes
Detect warp and other defects in lumber
Does framing, e.g., platform, braced, balloon, plank and beam, etc.

A. GABLE END STUDS
Lay out, cut, plumb and install gable studding

B. EXTERIOR EAVE AND RAKE TRIM INCLUDING SUBFASCIA, RIBBON, LOOKOUTS, AND FASCIA
Construct roof cornices (rake and eaves)
Level the ribbon

COMPETENCY No. 7 – TO APPLY ROOF SHEATHING, ROOFING FELT, AND SOFFIT
GENERAL TASKS
Recognize the direction of grain in wood
Differentiate and select plywood, gypsum board, hardboard, etc.

A. ROOF SHEATHING AND FELT
Install wall and roof sheathing
Install plywood, fiberboard, or gypsum sheathing
Install building paper on walls and roof

B. SOFFIT AT EAVES AND RAKE
See general tasks

COMPETENCY No. 8 – TO APPLY ASPHALT SHINGLES AND APPROPRIATE FLASHING
Adhere to Asphalt Roofing Manufacturers Association Standards
Install asphalt or composition shingles including starters and caps
Install flashing (paper and metal)

COMPETENCY No. 9 – TO SET EXTERIOR DOOR JAMBS, HANG DOORS, AND SET WINDOWS
Differentiate and select various molding types
Differentiate and select types and sizes of finish hardware
Assemble and install prefabricated window units
Detect warp and other defects in lumber
Assemble and install prefabricated door frames
Paint outer side of exterior door frames
Fit and hang mill-built door including hardware
Plumb and level doors and windows
Differentiate the working characteristics of types of hardwood and softwood

COMPETENCY No. 10 – TO APPLY HORIZONTAL AND VERTICAL WOOD OR WOOD-DERIVATIVE SIDING
Recognize the direction of grain in wood
Install building paper on walls and roof
Install bevel siding with mitered corners
Install bevel siding with corner boards
Install bevel siding with metal corners
Install drop or matched siding
Install water table
Install belt course
Level horizontal siding
Install flashing and weather stripping for windows
Install flashing and weather stripping for doors
Plumb and level vertical siding

COMPETENCY No. 11 – TO INSTALL BUILDING INSULATION
- Install rigid insulation
- Install batt insulation

COMPETENCY No. 12 – TO CONSTRUCT AND INSTALL SOFFIT FOR CABINETS
- Recognize the direction of grain in wood
- Differentiate nominal and finished sizes of lumber and select lumber sizes
- Differentiate and select plywood, gypsum board, hardboard, etc.
- Install backing for hanging fixtures and cabinets
- Plumb, level, and square soffit
- Detect warp and other defects in lumber

COMPETENCY No. 13 – TO LAY OUT, CUT, AND INSTALL UNDERLAYMENT ON FLOORS
- Lay out, cut and install floor underlayment
- Install hardboard, particle board or plywood underlayment
- Recognize direction of grain in plywood
- Differentiate and select plywood, hardboard, and particle board

COMPETENCY No. 14 – TO INSTALL INTERIOR DOORS AND JAMBS WITH TRIM AND HARDWARE

GENERAL TASKS
- Differentiate and select types and sizes of finish hardware
- Assemble and install prefabricated door frames
- Detect warp and other defects in lumber

A. INTERIOR DOOR JAMBS
- Plumb and level jamb
- Lay out, cut, and assemble interior door jamb

B. INTERIOR DOOR
- Determine proper clearance for door
- Spaces accordingly
- Hang interior door

C. DOOR TRIM AND HARDWARE
- Differentiate and select various molding types
- Install finish hardware (non-electric fixtures, locks, latches, knobs, etc.)

COMPETENCY No. 15 – TO INSTALL TRIM ON WINDOWS
- Detect warp and other defects in lumber
- Differentiate and select various molding types
- Differentiate and select types and sizes of finish hardware
- Cut and install interior window trim, mitering the corners

COMPETENCY No. 16 – TO LAY OUT, CUT, AND INSTALL A STAIRWAY
- Differentiate nominal and finished sizes of lumber and select lumber sizes
- Detect warp and other defects in lumber
- Construct various types of stairways (straight, platform, closed, open)
- Determine total rise and run of stairway
- Determine tread rise and run of stairway
- Determine the drop of the stair horse or stringer
- Determine amount of head room

Determine length of stock for stair horse or stringer
Lay out and cut a sawed-out stair horse or stringer
Install stair horse or stringer
Lay out, cut, and install risers
Lay out, cut, level, and install treads

COMPETENCY No. 17 – TO CUT AND INSTALL BASEBOARD
Differentiate the working characteristics of types of hardwood and softwood
Detect warp and other defects in lumber
Differentiate and select various molding types
Differentiate and select types and sizes of finish hardware
Cut and install baseboard

COMPETENCY No. 18 – TO INSTALL KITCH AND BATH CABINETS
Differentiate and select types and sizes of finish hardware
Install mill-built cabinets
Plumb and level cabinets

Glossary

Items included are subject to different interpretations. These definitions are applicable for use in context of this material.

GLOSSARY

Built-Up Girder
A large supporting horizontal member composed of two or more dimensional wood pieces fastened together to carry an imposed load.

Competency
Demonstration of suitable or sufficient skill, knowledge or experience

Component
A part of a house assembled before delivery to the building site or an element of something larger.

Equipment
Tools or devices necessary for performing the skills required for competency, or for a specific purpose.

Floor System
The entire floor construction for the platform frame including the following essential parts: girder, mudsill, box header, floor joists, crossbridging, solid backing and sub-floor.

H.U.D.
Housing and Urban Development.

Identify and Describe
To give an account of: orally, in writing, or by demonstration.

Modular Layout
Layout conforming to the module commonly established at four inches or multiples of four inches which coordinates the layout to stock unit sizes of building materials.

Picture Frame Method
Casing installation using a flat miter at each corner resembling a picture frame.

Platform Framing (western frame)
Framing where each wall system is built after a complete floor system. The individual floor and wall sequence is completed before another is placed directly on top. No studs are continuous between floors such as in balloon or braced framing.

Ribbon
Ledger, nailer.

Set
Proper installation according to the manufacturer's instructions.

Site Layout
Locating a building on a piece of ground through the use of plot plan.

Soffit
Plancier at both eaves and rake.

Story Pole
A pole or rod containing necessary information or measurements used to establish correct applications or elevations of building components such as horizontal siding.

Underlayment
Floor covering consisting of particle board, plywood or hardboard and providing a level surface for a carpet or other resilient flooring.

Water Table
A drip cap placed horizontally above the foundation and included in the exterior wood or masonry finish to repell water away from the wall or footing.

Individual Student Record

A complete and accurate record may be used by students for job applications and for planning post-secondary education. For reference purposes, photocopies of individual student records may be given to the student. Original copies of all records should remain in the Student Services Department of the school.

CARPENTRY OCCUPATIONS

Name of Student

School Stamp

This is to certify that the above named student has demonstrated proficiency in the following tasks:

Comp	Task	Date Completed	Instructor
1.	Lay out building		
2.	Floor system A. Built-up girder B. Mud sill, box header, floor joist C. Crossbridging & blocking D. Sub-floor		
3.	Frame walls & Sheathing A. Exterior frame walls B. Interior frame walls		
4.	Ceiling joists & bracing		
5.	Ridge, rafters, & bracing A. Ridge board B. Common rafters & Bracing		
6.	Gables, fascia, ribbons & lookouts A. Gable end studs B. Subfascia, ribbon, lookouts, fascia		
7.	Roof sheathing, felt, soffit A. Sheathing & felt B. Soffit at eaves & rake		
8.	Shingles & flashing		

Comp	Task	Date Completed	Instructor
9.	Exterior jambs, doors, windows A. Jambs B. Doors C. Windows		
10.	Siding		
11.	Insulation		
12.	Cabinet soffit		
13.	Floor underlayment		
14.	Interior doors, jamb, trim, hardware A. Interior jambs B. Interior door C. Trim & hardware		
15.	Window trim		
16.	Stairways		
17.	Baseboard		
18.	Cabinets		

School Official Signature

Student Signature

Class Competency Record

It is important that complete and accurate competency records be maintained for all students. Teachers, administrators, students and people in business and industry may benefit from this information.

CARPENTRY
STUDENT RECORD CLASS ROSTER

	Lay out building	Built-up girder		Mud sill, box header, floor joist		Crossbridging & blocking	Sub-floor	Exterior frame walls		Interior frame walls	Ceiling joists & bracing	Ridge board		Common rafters & bracing		Gable end studs	Subfascia, ribbon, lookouts, fascia		Sheathing & felt	Soffit at eaves & rake		Shingles & flashing	Jambs		Doors	Windows		Siding	Insulation	Cabinet soffit	Floor underlayment	Interior jambs		Interior doors	Trim & hardware	Window trim	Stairways	Baseboard	Cabinets
1		2						3			4	5				6			7			8	9					10	11	12	13	14				15	16	17	18
		A		B		C	D	A		B		A		B		A		B	A		B		A		B		C					A		B		C				